



BEST AVAILABLE COPY

PTO/SB/08A (10-01)

Approved for use through 10/31/2002, OMB 0651-0031

U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1449A/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(use as many sheets as necessary)

Sheet

1

of 3

Complete If Known

Application Number	10/782,939
Filing Date	February 23, 2004
First Named Inventor	Erik J. Shahoian
Art Unit	2674
Examiner Name	Unassigned
Attorney Docket Number	IMMR046/02US

U.S. PATENT DOCUMENTS

Examiner	Cite No. ¹	Document Number Number Kind Code ² (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		6,422,941	7/23/2002	Thomer et al.	
		6,219,034	04/17/2001	Elbing et al.	
		6,160,489	12/12/2000	Perry et al.	
		6,111,577	8/29/2000	Zilles et al.	
		5,766,016	6/16/1998	Sinclair	
		5,690,582	11/25/1997	Ulrich et al.	
		5,575,761	11/19/1996	Hallanpour	
		5,437,807	8/1/1995	Taylor	
		5,436,822	7/25/1995	Gutman et al.	
		5,283,970	2/8/1994	Aigner	
		5,186,895	2/16/1993	Mangseth et al.	
		5,175,459	12/29/1992	Daniel et al.	
		5,165,897	11/24/1992	Johnson	
		5,022,384	6/11/1991	Freels	
		4,885,585	12/6/1989	Embach	
		4,484,191	1/1/20/1984	Vavra	
		4,464,117	8/7/1984	Foerst	
		4,333,070	6/1/1982	Barnes	
		4,262,549	4/21/1981	Schwellenbach	
		4,127,752	11/28/1978	Lowthorp	
		2,972,140	2/14/1961	Hirsch	

had been considered.

Examiner Signature	Date Considered
--------------------	-----------------

¹EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

²Applicant's unique citation designation number (optional). ³Kind Codes of U.S. Patent Documents at www.uspto.gov or MPEP 901.04. ⁴Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). ⁵For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁶Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST. 16 if possible. ⁷Applicant is to place a check mark here if English language Translation is attached.

Burden Hour Statement: This form is estimated to take 2.0 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Washington, DC 20231

BEST AVAILABLE COPY

PTO/SB/08A (10-01)

Approved for use through 10/31/2002. OMB 0651-0031

U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1449A/PTO				Complete If Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT <i>(use as many sheets as necessary)</i>				Application Number	10/782,939
Sheet	2	of	3	Filing Date	February 23, 2004
				First Named Inventor	Erik J. Shaholian
				Art Unit	2674
				Examiner Name	Unassigned
				Attorney Docket Number	IMMR046/02US

OTHER PRIOR ART – NON PATENT LITERATURE DOCUMENTS		
Examiner Initials *	Cite No. ¹	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.
RL		PATRICK, "Design, Construction, and Testing of a Fingertip Tactile Display for Interaction with Virtual and Remote Environments," <i>Master of Science Thesis</i> , MIT, Aug. 1990, archived Nov. 8, 1990.
		CALDER, "Design of A Force-Feedback Touch-Introducing Actuator For Teleoperator Robot Control," <i>Bachelor of Science Thesis</i> , MIT, May 1983, archived June 23, 1983.
		WIKER, "Teletouch Display Development Phase 1 Report," <i>Technical Report 1230</i> , Naval Ocean Systems Center, San Diego, July 1988.
		BLISS, "Optical-to-Tactile Image Conversion for the Blind," <i>IEEE Transactions on Man-Machine Systems</i> , Vol. MMS-11, No. 1, March 1970.
		JOHNSON, "Shape-Memory Alloy Tactile Feedback Actuator," <i>Armstrong Aerospace Medical Research Laboratory, AAMRL-TR-90-039</i> , August, 1990.
		KONTARINIS et al., "Tactile Display of Vibratory Information In Teleoperation and Virtual Environments," <i>PRESENCE</i> , 4(4):387-402, Harvard Univ., 1995.
		AUKSTAKALNIS et al., "Silicon Mirage: The Art and Science of Virtual Reality," ISBN 0-938151-82-7, pp. 129-180, 1992.
		EBERHARDT et al., "Inducing Dynamic Haptic Perception by The Hand: System Description and Some Results," <i>DSC-Vol. 55-1, Dynamic Systems and Control Volume 1</i> , ASME 1994.
		GOBEL et al., "Tactile Feedback Applied to Computer Mice," <i>International Journal of Human-Computer Interaction</i> , Vol. 7, No. 1, pp. 1-24, 1995.
		PIMENTEL et al., "Virtual Reality: through the new looking glass," 2 nd Edition; McGraw-Hill, ISBN 0-07-050167-X, pp. 41-202, 1994.
		"Cyberman Technical Specification," <i>Logitech Cyberman SWIFT Supplement to Logitech Mouse Technical Reference and Programming Guide</i> , 4/5/1994.
		OUHYOUNG et al., "The Development of A Low-Cost Force Feedback Joystick and Its Use in the Virtual Reality Environment," <i>Proceedings of the Third Pacific Conference on Computer Graphics and Applications, Pacific Graphics '95</i> , Seoul, Korea, 21-24 August 1995.
		KACZMAREK et al., "Tactile Displays," <i>Virtual Environment Technologies</i> , Chap. 9, pp. 349-414.
▼		LAKE, "Cyberman from Logitech," at http://www.biblio.org/GameBytes/Issue21/reviews/cyberman.html , 1994.
▼		YAMAKITA et al., "Tele-Virtual Reality of Dynamic Mechanical Model," <i>Proceedings of the 1992 IEEE/RSJ International Conference on Intelligent Robots and Systems</i> , Raleigh, NC, July 7-10, 1992

Examiner Signature	/Regina Liang/	Date Considered	12/06/2006
--------------------	----------------	-----------------	------------

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

¹ Applicant's unique citation designation number (optional). ² Applicant is to place a check mark here if English language Translation is attached.

Burden Hour Statement: This form is estimated to take 2.0 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Washington, DC 20231.

BEST AVAILABLE COPY

PTO/SB/08A (10-01)

Approved for use through 10/31/2002. OMB 0651-0031
U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1449A/PTO				Complete If Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Application Number	10/782,939
(use as many sheets as necessary)				Filing Date	February 23, 2004
Sheet	3	of	3	First Named Inventor	Erik J. Shahoian
				Art Unit	2674
				Examiner Name	Unassigned
				Attorney Docket Number	IMMR046/02US

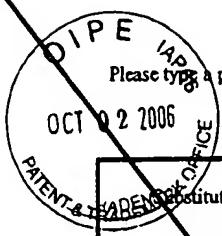
OTHER PRIOR ART – NON PATENT LITERATURE DOCUMENTS			
Examiner Initials *	Cite No. ¹	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	
RL		NOLL, "Man-Machine Tactile," <i>SID Journal</i> , July/August 1972 Issue.	
RL		ROSENBERG, "Virtual Fixtures: Perceptual Overlays Enhance Operator Performance In Telepresence Tasks," <i>Ph.D. Dissertation</i> , Stanford University, June 1994.	

Examiner Signature	/Regina Liang/	Date Considered	12/06/2006
--------------------	----------------	-----------------	------------

¹EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

² Applicant's unique citation designation number (optional). ³ Applicant is to place a check mark here if English language Translation is attached.

Burden Hour Statement: This form is estimated to take 2.0 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Washington, DC 20231.



Please type a plus sign (+) inside this box → +

BEST AVAILABLE COPY

PTO/SB/08A (08-00)

Institute for form 1449A/PTO				<i>Complete if Known</i>	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT <i>(use as many sheets as necessary)</i>				Application Number	
Sheet	1	of	9	Filing Date	Herewith
				First Named Inventor	Erik SHAHOIAN
				Group Art Unit	
				Examiner Name	
				Attorney Docket Number	IMMR-046/02US

U.S. PATENT DOCUMENTS					
Examiner Initials*	Cite No. ¹	U.S. Patent Document		Name of Patentee or Applicant of Cited Document	Date of Publication of Cited Document MM-DD-YYYY
		Number	Kind Code ² (if known)		
		6,243,078		Rosenberg	06/2001
		6,219,032		Rosenberg et al.	04/17/2001
		6,166,723		Schena et al.	12/26/2000
		6,128,006		Rosenberg	10/03/2000
		6,100,874		Schena et al.	08/08/2000
		6,088,019		Rosenberg	06/11/2000
		6,088,017		Tremblay et al.	06/11/2000
		6,078,308		Rosenberg et al.	06/20/2000
		6,037,927		Rosenberg	03/14/2000
		6,028,593		Rosenberg et al.	02/22/2000
		6,024,576		Bevirt	02/15/2000
		6,020,876		Rosenberg et al.	02/01/2000
		6,004,134		Marcus et al.	12/21/1999
		6,001,014		Ogata et al.	12/14/1999
		5,990,869		Kubica et al.	11/23/1999
		5,987,437		Nishiumi et al.	04/27/1999
		5,986,643		Harvill et al.	11/16/1999
		5,973,689		Gallery	10/26/1999
		5,959,613		Rosenberg et al.	09/28/1999
		5,956,484		Rosenberg et al.	09/21/1999
		5,956,016		Kruenzner et al.	09/21/1999
		5,944,151		Jakobs et al.	08/31/1999
		5,929,846		Rosenberg et al.	07/27/1999
		5,914,705		Johnson et al.	06/22/1999
		5,912,661		Siddiqi	06/15/1999
		5,889,670		Schuler et al.	03/30/1999
		5,880,714		Rosenberg et al.	03/09/1999
		5,844,392		Peurach et al.	12/01/1998
		5,831,408		Jacobus et al.	11/03/1998
		5,825,309		Rosenberg	10/20/1998
		5,821,921		Osborn et al.	10/13/1998
		5,808,603		Chen	09/15/1998
		5,805,140		Rosenberg et al.	09/08/1998
		5,802,353		Avila et al.	09/01/1998
		5,790,108		Salcudean et al.	08/04/1998
		5,785,630		Bobick et al.	07/28/1998
		5,784,052		Keyson	07/21/1998
		5,781,172		Engel et al.	07/14/1998
		5,771,037		Jackson	06/23/1998
		5,769,640		Jacobus et al.	06/23/1998

¹ Unique citation designation number.

² See attached Kinds of U.S. Patent Documents.

Examiner Signature	had been considered	Date Considered
--------------------	---------------------	-----------------

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

Substitute for form 1449A/PTO				<i>Complete if Known</i>	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT <i>(use as many sheets as necessary)</i>					
Sheet	2	of	9	Application Number	
				Filing Date	Herewith
				First Named Inventor	Erik SHAHOIAN
				Group Art Unit	
				Examiner Name	
				Attorney Docket Number	IMMR-046/02US

5,767,839	Rosenberg	06/16/1998
5,757,358	Osga	05/26/1998
5,755,577	Gillio	05/26/1998
5,755,016	Sinclair et al.	06/16/1998
5,754,023	Roston et al.	05/19/1998
5,745,715	Pickover et al.	04/28/1998
5,742,278	Chen et al.	04/21/1998
5,739,811	Rosenberg et al.	04/14/1998
5,736,578	Hasser et al.	04/07/1998
5,734,373	Rosenberg et al.	03/31/1998
5,731,804	Rosenberg	03/24/1998
5,724,278	Chen et al.	04/21/1998
5,724,106	Autry et al.	03/3/1998
5,721,566	Rosenberg et al.	02/24/1998
5,714,978	Yamanaka et al.	02/03/1998
5,709,219	Chen et al.	01/20/1998
5,694,013	Stewart et al.	12/02/1997
5,691,898	Rosenberg et al.	11/25/1997
5,691,747	Amano	11/25/1997
5,666,473	Wallace	09/09/1997
5,666,138	Culver	09/09/1997
5,656,901	Kurita	08/12/1997
5,643,087	Marcus et al.	07/1997
5,642,469	Hannaford et al.	06/24/1997
5,629,594	Jacobus et al.	05/13/1997
5,625,576	Massie et al.	04/29/1997
5,596,347	Robertson et al.	01/21/1997
5,591,082	Jensen et al.	01/07/1997
5,589,854	Tsai	12/1996
5,589,828	Armstrong	12/1996
5,587,937	Massie et al.	12/24/1996
5,583,407	Yanaguchi	12/10/1996
5,577,981	Javik	11/26/1996
5,576,727	Rosenberg et al.	11/19/1996
5,565,887	McCambridge et al.	10/15/1996
5,547,382	Yamasaki et al.	08/20/1996
5,542,672	Meredith	08/06/1996
5,530,455	Gillick et al.	06/25/1996
5,513,100	Parker et al.	04/30/1996
5,512,919	Araki	04/30/1996
5,506,605	Palcy	04/09/1996
5,491,477	Clark et al.	02/13/1996
5,473,344	Bacon et al.	12/05/1995
5,466,213	Hogan et al.	11/14/1995
5,459,382	Jacobus et al.	10/17/1995
5,457,479	Cheng	10/10/1995
5,451,924	Massimino et al.	09/1995
5,414,337	Schuler	05/1995
5,405,152	Katanics et al.	04/11/1995
5,399,091	Mitsumoto	03/21/1995
5,398,044	Hill	03/14/1995
5,396,266	Brimhall	03/07/1995
5,389,865	Jacobus et al.	02/14/1995
5,381,080	Schnell et al.	01/10/1995

Examiner Signature	Date Considered
--------------------	-----------------

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

Substitute for form 1449A/PTO				<i>Complete if Known</i>	
				Application Number	
				Filing Date	Herewith
				First Named Inventor	Erik SHAHOIAN
				Group Art Unit	
				Examiner Name	
Sheet	3	of	9	Attorney Docket Number	IMMR-046/02US

5,355,148		Anderson	10/11/1994
5,354,162		Burdea et al.	10/11/1994
5,341,459		Backes	08/23/1994
5,334,027		Wherlock	08/2/1994
5,313,230		Venolia et al.	05/17/1994
5,309,140		Everett, Jr. et al.	05/3/1994
5,299,810		Pierce et al.	04/05/1994
5,276,871		Paley	03/22/1994
5,286,903		Fuller et al.	02/15/1994
5,275,506		Moncrief	01/4/1994
5,275,174		Cook	01/04/1994
5,271,290		Fischer	12/21/1993
5,264,768		Gregory et al.	11/23/1993
5,240,417		Smithson et al.	08/31/1993
5,235,868		Culver	08/17/1993
5,223,776		Radke et al.	06/29/1993
5,220,260		Schuler	06/15/1993
5,212,473		Louis	05/18/1993
5,203,563		Loper, III	04/20/1993
5,197,003		Moncrief et al.	03/23/1993
5,193,963		McAfee et al.	03/16/1993
5,189,355		Larkins et al.	02/23/1993
5,186,629		Rohen	02/16/1993
5,185,561		Good et al.	02/09/1993
5,184,319		Kramer	02/02/1993
5,146,566		Hollis, Jr. et al.	09/08/1992
5,116,180		Fung et al.	05/26/1992
5,107,262		Cadoz et al.	04/21/1992
5,107,080		Rosen	04/21/1992
5,103,404		McIntosh	04/07/1992
5,095,303		Clark et al.	03/10/1992
5,078,152		Bond et al.	01/07/1992
5,075,517		Ferranti et al.	12/31/1991
5,044,956		Behensky et al.	09/03/1991
5,038,089		Szakaly	08/06/1991
5,035,242		Franklin et al.	07/30/1991
5,022,407		Horch et al.	06/11/1991
5,019,761		Draft	05/28/1991
5,007,300		Siva	04/16/1991
5,004,391		Burdea	04/02/1991
4,983,991		Lehner	01/08/1991
4,961,038		MacMinn	10/02/1990
4,949,119		Moncrief et al.	08/14/1990
4,934,694		McIntosh	06/19/1990
4,930,770		Baker	06/05/1990
4,896,554		Culver	01/30/1990
4,891,764		McIntosh	01/02/1990
4,868,549		Affinito et al.	09/19/1989
4,853,874		Iwamoto et al.	08/01/1989
4,839,838		LaBiche et al.	06/13/1989
4,837,734		Ichikawa et al.	06/06/1989
4,823,634		Culver	04/25/1989
4,800,721		Cerneska et al.	01/31/1989
4,795,296		Jau	01/1989

Examiner Signature	Date Considered
--------------------	-----------------

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

Substitute for form 1449A/PTO				<i>Complete if Known</i>	
				Application Number	
				Filing Date	Herewith
				First Named Inventor	Erik SHAHOIAN
				Group Art Unit	
				Examiner Name	
Sheet	4	of	9	Attorney Docket Number	IMMR-046/02US

4,794,392	Selinko	12/27/1988
4,794,384	Jackson	12/27/1988
4,782,327	Kley et al.	11/01/1988
4,713,007	Alban	12/15/1987
4,708,656	de Vries et al.	11/24/1987
4,706,294	Ouchida	11/10/1987
4,689,449	Rosen	08/25/1987
4,604,016	Joyce	08/05/1986
4,603,284	Perzley	07/29/1986
4,599,070	Hladky et al.	07/08/1986
4,581,491	Boothroyd	04/08/1986
4,560,983	Williams	12/24/1985
4,513,235	Acklam et al.	04/23/1985
4,477,043	Repperger	10/16/1984
4,398,889	Lam et al.	8/16/1983
4,236,325	Hall et al.	12/02/1980
4,160,508	Salisbury, Jr.	7/10/1979
3,923,166	Fletcher et al.	12/02/1975
3,919,691	Noll	11/11/1975
3,911,416	Feder	10/07/1975
3,903,614	Diamond et al.	09/09/1975
3,902,687	Hightower	09/02/1975
3,623,064	Kagan	11/23/1971
3,517,446	Corlyon et al.	06/30/1970
3,497,668	Hirsch	02/24/1970
3,220,121	Cutler	11/30/1965
3,157,853	Hirsch	11/17/1964

FOREIGN PATENT DOCUMENTS						
Examiner Initials*	Cite No. ¹	Foreign Patent Document			Name of Patentee or Applicant of Cited Document	Date of Publication of Cited Document MM-DD-YYYY
		Office ¹	Number ²	Kind Code ³ (if known)		
RL	EP	0 626 634	A2		Yoshiaki et al.	11/1994
	WO	95/20788				08/03/1995
	WO	97/20305				06/05/1997
	WO	97/31333				08/28/1997
	EP	0265011	A1			04/27/1988
	EP	0607580	A1			07/27/1994
	WO	92/00559				01/09/1992
	WO	97/20305				06/05/1997
	WO	00/21071				04/13/2000
	WO	00/03319				01/20/2000
V	WO	96/28777				09/19/1996
	WO	95/32459				11/30/1995

* Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3).

² For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document.

³ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST. 16 if possible.

⁴ Applicant is to place a check mark here if English language Translation is attached.

Examiner Signature	/Regina Liang/	Date Considered	12/06/2006
--------------------	----------------	-----------------	------------

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

Substitute for form 1449A/PTO				<i>Complete if Known</i>	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT <i>(use as many sheets as necessary)</i>				Application Number Filing Date First Named Inventor Group Art Unit Examiner Name	<i>Herewith</i> Erik SHAHOIAN
Sheet	5	of	9	Attorney Docket Number	
IMMR-046/02US					

OTHER PRIOR ART - NON PATENT LITERATURE DOCUMENTS

OTHER PRIOR ART - NON PATENT LITERATURE DOCUMENTS		
Examiner Initials*	Cite No. [†]	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.
RL		Minsky et al., "Feeling and Seeing: Issues in Force Display," ACM 089791-351-5/90/0003, pp. 235-242 270.
		Iwata, Hiroo, "Artificial Reality with Force-feedback: Development of Desktop Virtual Space with Compact Master Manipulator," Computer Graphics, Vol. 24, No. 4, Aug. 1990, pp. 165-170
		Akamatsu et al., "Multimodal Mouse: A Mouse-Type Device with Tactile and Force Display," Presenace, Vol. 3, No. 1, Winter 1994, pp. 73-80
		Hasser, C. et al., "Tactile Feedback with Adaptive Controller for a Force-Reflecting Haptic Display," Parts I and 2, IEEE 0-7803-3131-1, 1996, pp. 526-533
		Hasser, C., "Tactile Feedback for a Force-Reflecting Haptic Display," School of Eng., Univ. of Dayton, Dayton, OH, 1995, pp. 1-98
		Dennerlein et al., "Vibrotactile Feedback for Industrial Telemanipulators," 6 th Annual Symp. On Haptic Interfaces for Virtual Environment and Teleoperator Systems, ASME IMECE, Nov. 1997, pp. 1-7
		Dennerlein, Jack et al., "Commercialization of Vibrotactile Feedback for Telemanipulation and Virtual Environments," 1997, Phase I Final Report for ONR Contract N00014-96-C-0325 (not published or publicly available)
		Atkinson et al., "Computing With Feeling," Comput. & Graphics, Vol. 2, 1997, pp. 97-103
		Kilpatrick, "The Use Of A Kinesthetic Supplement In An Interactive Graphics System," Dept. of Computer Science, Univ. of North Carolina, Chapel Hill, 1976, pp. i-175
		Wiker et al., "Development of Tactile Mice for Blind Access to Computers: Importance of Stimulation Locus, Object Size, and Vibrotactile Display Resolution," Proc. of the Human Factors Society 35 th Annual Meeting, 1991
		Brooks, Jr. et al., "Project GROPE - Haptic Displays for Scientific Visualization," Computer Graphics, Vol. 24, No. 4, Aug. 1990, pp. 177-185
		Howe et al., "Task Performance with a Dextrous Teleoperated Hand System," Proc. of SPIE, Vol. 1833, Nov. 1992
		Rosenberg, "Perceptual Design of a Virtual Rigid Surface Contact," Armstrong Lab, April 1993, pp. 1-40
		Rosenberg, "Virtual Fixtures as Tools to Enhance Operator Performance in Telepresence Environments," SPIE Telemanipulator Technology, 1993
		Rosenberg, "Virtual Haptic Overlays Enhance Performance in Telepresence Tasks," Dept. of Mech. Eng., Stanford Univ., 1994
		Gotow et al., "Perception of Mechanical Properties at the Man-Machine Interface," IEEE CH2503-Jan. 1987, pp. 688-689
		Russo, "The Design and Implementation of a Three Degree-of-Freedom Force Output Joystick," Dept. of Mech. Eng., May 1990
		Rosenberg, "A Force Feedback Programming Primer - for PC Gaming Peripherals Supporting I-Force 2.0 and Direct - X 5.0," Immersion Corp., 1997
		Winey III, "Computer Simulated Visual and Tactile Feedback as an Aid to Manipulator and Vehicle Control," Dept. of Mech. Eng., MIT, June 1981
		Payette et al., "Evaluation of a Force Feedback (Haptic) Computer Pointing Device in Zero Gravity, DSC-Vol. 58, Proc. of ASME Dynamics Systems and Control Div., Oct. 1996, pp. 547-553

Examiner Signature:	/Regina Liang/	Date Considered	12/06/2006
------------------------	----------------	--------------------	------------

***EXAMINER:** Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

Substitute for form 1449A/PTO				<i>Complete if Known</i>	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT <i>(use as many sheets as necessary)</i>					
Sheet	6	of	9	Attorney Docket Number	IMMR-046/02US

RL	Ramstein, "Combining Haptic and Braille Technologies: Design Issues and Pilot Study," ACM 0-89791-776, pp. 37-44
	Rosenberg et al., "The Use of Force Feedback to Enhance Graphical User Interfaces," Proc. SPIE 2653, 1996, pp. 243-248
	Rosenberg et al., "Commercially Viable Force Feedback Controller for Individuals with Neuromotor Disabilities," USAF Armstrong Lab., May 1996
	Schmult et al., "Application Areas for a Force-Feedback Joystick," DSC-Vol. 49, Advances in Robotics, Mechatronics, and Haptic Interfaces, ASME 1993, pp. 47-54
	Tan et al., "Manual Resolution of Compliance When Work and Force Cues are Minimized," DSC-Vol. 49, Advances in Robotics, Mechatronics, and Haptic Interfaces, ASME 1993, pp. 99-104
	Burdea et al., "Distributed Virtual Force Feedback," IEEE Workshop on Force Display in Virtual Environments and its Application to Robotic Teleoperation, May 1993
	Fischer et al., "Specification and Design of Input Devices for Teleoperation," IEEE CH2876, Jan. 1990, pp. 540-545
	Kotoku, "A Predictive Display with Force Feedback and its Application to Remote Manipulation System with Transmission Time Delay," Proc. of IEEE/RSJ Int'l Conf. On Intelligent Robots and Systems, July 1992
	Jacobsen et al., "High Performance, High Dexterity, Force Reflective Teleoperator II," ANS Topical Mtg. On Robotics and Remote Systems, Fed. 1991
	Ouh-young et al., "Using a Manipulator for Force Display in Molecular Docking," IEEE CH2555, 1998, pp. 1824-1829
	Hannaford et al., "Performance Evaluation of a Six-Axis Generalized Force-Reflecting Teleoperator," IEEE Trans. On Systems, Man, and Cybernetics, Vol. 21, No. 3, May/June 1991
	Hirota et al., "Development of Surface Display," IEEE 0-7803-1363, 1993, pp. 256-262
	Ellis et al., "Design and Evaluation of a High-Performance Prototype Planar Haptic Interface," DSC-Vol. 49, Advances in Robotics, Mechatronics, and Haptic Interfaces, ASME Dec. 1993, pp. 55-64
	Millman et al., "Design of a Four Degree-of-Freedom Force-Reflecting Manipulandum With a Specified Force/Torque Workspace," Proc. IEEE Int'l Conf. On Robotics and Automation, April 1991, pp. 1488-1493
	Kelley et al., "MagicMouse: Tactile and Kinesthetic Feedback in the Human-Computer Interface Using an Electromagnetically Actuated Input/Output Device," Dept. of Elec. Eng., Univ. of British Columbia, Oct. 1993
	Ouh-young et al., "Creating an Illusion of Feel: Control Issues in Force Display," Computer Science Dept., Univ. of North Carolina, Chapel Hill, Sept. 1989, pp. 1-14
	Hannaford et al., "Force-Feedback Cursor Control," NASA Tech Brief, Vol. 13, No. 11, Item #21, Nov. 1989
	Buttolo et al., "Pen-Based Force Display for Precision Manipulation in Virtual Environments," IEEE 0-8186-7084, Mar. 1995, pp. 217-224
	Bejczy et al., "The Phantom Robot: Predictive Displays for Teleoperation with Time Delay," IEEE CH2876, Jan. 1990, pp. 546-550
	Adelstein et al., "A High Performance Two Degree-of-Freedom Kinesthetic Interface," MIT, 1992, pp. 108-112
	Kotoku et al., "Environment Modeling for the Interactive Display (EMID) Used in Telerobotic Systems," IEEE/RSJ Int'l Workshop on Intelligent Robots and Systems, Nov. 1991, pp. 999-1004
	Su et al., "The Virtual Panel Architecture: A3D Gesture Framework," IEEE 0-7803-1363, Jan. 1993, pp. 387-393
	Yamakita et al., "Tele-Virtual Reality of Dynamic Mechanical Model," Proc. of IEEE/RSJ- Int'l Conf. On Intelligent Robots and Systems, July 1992, pp. 1103-1110
	Batter et al., "GROPE-I: A Computer Display to the Sense of Feel," Proc. IFIP Congress 1971, pp. 759-763
	Adachi et al., "Sensory Evaluation of Virtual Haptic Push-Buttons," Technical Research Center, Suzuki Motor Corp., Yokohama, 1994
	Adelstein et al., "Design and Implementation of a Force Reflecting Manipulandum for Manual Control Research," NASA-Ames Research Center/Dept. of Mech. Eng., MIT, 1992
	Jones et al., "A Perceptual Analysis of Stiffness," Experimental Brain Research, 1990
	Ouh-young, "Force Display in Molecular Docking," Dept. of Computer Science, Univ. of North Carolina, Chapel Hill, 1990
▼	Yokokohji et al., "What You Can See is What You Can Feel - Development of a Visual/Haptic Interface to Virtual Environment," Proc. VRAIS 1996

Examiner Signature	/Regina Liang/	Date Considered	12/06/2006
--------------------	----------------	-----------------	------------

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

Substitute for form 1449A/PTO				<i>Complete if Known</i>	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT <i>(use as many sheets as necessary)</i>				Application Number	
				Filing Date	Herewith
				First Named Inventor	Erik SHAHOIAN
				Group Art Unit	
				Examiner Name	
Sheet	7	of	9	Attorney Docket Number	IMMR-046/02US

RL	Kelley et al., "On the Development of a Force-Feedback Mouse and its Integration into a graphical user Interface," 11/94, Engineering Congress and Exhibition, pp. 1-8
	Ramstein, "Combining Haptic & Brailier Technologies: Design Issues and Pilot Study," 1996, Siggraph pp. 37-44
	Su et al., "The Virtual Panel Architecture: A 3D Gesture Framework," University of Maryland, pp. 387-393
	Ramstein et al., "The Pantograph: A Large Workspace Haptic Device for a Multimodal Human-Computer Interaction," Computer-Human Interaction, CHI 1994, pp. 1-3
	Munch et al., "Intelligent Control for Haptic Displays," Eurographics '96, Vol. 15, No. 3, 1996, pp. 217-226
	Colgate et al., "Implementation of Stiff Virtual Walls in Force-Reflecting Interfaces," Northwestern University, IL 1993, pp. 1-8
	Rosenberg et al., "Perceptual Decomposition of Virtual Haptic Surfaces," Proc. IEEE Symposium on Research Frontiers in Virtual Reality, 1993, pp. 1-8
	Iwata, Hiroo, "Pen-Based Haptic Virtual Environment," IEEE 0-7803-1363-1, 1993, pp. 287-292
	Baigrie, "Electric Control Loading - A Low Cost, High Performance Alternative," Proceedings of Interservice/Industry Training Systems Conference, pp. 247-254, November 6-8, 1990
	Iwata, "Pen-based Haptic Virtual Environment," 0-7803-1363-1/93 IEEE, pp. 287-292, 1993
	Russo, "The Design and Implementation of a Three Degree of Freedom Force Output Joystick," MIT Libraries Archives pp. 1-131, May 1990, archived 8/14/90
	Brooks et al., "Hand Controllers for Teleoperation - A State-of-the-Art Technology Survey and Evaluation," JPL Publication 85-11, NASA-CR-175890; N85-28559, pp. 1-84, 03/1/1985
	Jones et al., "A perceptual analysis of stiffness," ISSN 0014-4819 Springer International (Springer-Verlag); Experimental Brain Research, Vol. 79, No. 1, pp. 150-156, 1990
	Burdea et al., "Distributed Virtual Force Feedback, Lecture Notes for Workshop on Force Display in Virtual Environments and its Application to Robotic Teleoperation," 1993 IEEE International Conference on Robotics and Automation, pp. 25-44, 05/02/1993
	Snow et al., "Model-X Force-Reflecting-Hand-Controller," NT Control No. NPO-17851; JPL Case No. 7348, pp. 1-4 with 45 pages of attachments, 06/15/1989
	Ouh-Young, "Force Display in Molecular Docking," Doctoral Dissertation, University of North Carolina at Chapel Hill, UMI Order No. 9034744, p. 1-369, 1990
	Tadros, "Control System Design for a Three Degree of Freedom Virtual Environment Simulator Using Motor/Brake Pair Actuators," MIT Archive, pp. 1-88, February 1990, archived 8/13/90
	Caldwell et al., "Enhanced Tactile Feedback (Tele-Taction) Using a Multi-Functional Sensory System," 1050-4729/93, pp. 955-960, 1993
	Adelstein et al., "Design and Implementation of a Force Reflecting Manipulandum for Manual Control research," DSC-Vol. 42, Advances in Robotics, pp. 1-12, 1992
	Gotow et al., "Controlled Impedance Test Apparatus for Studying Human Interpretation of Kinesthetic Feedback," WA11-11:00, pp. 332-337
	Stanley et al., "Computer Simulation of Interacting Dynamic Mechanical Systems Using Distributed Memory Parallel Processors," DSC-Vol. 42, Advances in Robotics, pp. 55-61, ASME 1992
	Russo, "Controlling Dissipative Magnetic Particle Brakes in Force Reflective Devices," DSC-Vol. 42, Advances in Robotics, pp. 63-70, ASME 1992
	Kontarinis et al., "Display of High-Frequency Tactile Information to Teleoperators," Telemanipulator Technology and Space Telerobotics, Won S. Kim, Editor, Proc. SPIE Vol. 2057, pp. 40-50, Sep. 7-9, 1993
	Patrick et al., "Design and Testing of A Non-reactive, Fingertip, Tactile Display for Interaction with Remote Environments," Cooperative Intelligent Robotics in Space, Rui J. deFigueiredo et al, Editor, Proc. SPIE Vol. 1387, pp. 215-222, 1990
	Adelstein, "A Virtual Environment System For The Study of Human Arm Tremor," Ph.D. Dissertation, Dept. of Mechanical Engineering, MIT, June 1989, archived 3/13/90
	Bejczy, "Sensors, Controls, and Man-Machine Interface for Advanced Teleoperation," Science, Vol. 208, No. 4450, pp. 1327-1335, 1980
	Bejczy et al., "Generalization of Bilateral Force-Reflecting Control of Manipulators," Proceedings Of Fourth CISM-IFTOMM, Sep. 8-12, 1981
	McAfee et al., "Teleoperator Subsystem/Telerobot Demonstrator. Force Reflecting Hand Controller Equipment Manual," JPL 1988, JPL D-5172

Examiner Signature	/Regina Liang/	Date Considered	12/06/2006
--------------------	----------------	-----------------	------------

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

Substitute for form 1449A/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT <i>(use as many sheets as necessary)</i>				Application Number	
Filing Date	Herewith				
First Named Inventor	Erik SHAHOIAN				
Group Art Unit					
Examiner Name					
Sheet	8	of	9	Attorney Docket Number	IMMR-046/02US

RL	Minsky, "Computational Haptics: The Sandpaper System for Synthesizing Texture for a Force-Feedback Display," <i>Ph.D. Dissertation, MIT, June 1995, archived 7/6/95</i>	
	Jacobsen et al., "High Performance, Dextrous Telerobotic Manipulator With Force Reflection," <i>Intervention/ROV '91 Conference & Exposition, Hollywood, Florida, May 21-23, 1991</i>	
	Shimoga, "Finger Force and Touch Feedback Issues in Dexterous Telemanipulation," <i>Proceedings of Fourth Annual Conference on Intelligent Robotic Systems for Space Exploration, Rensselaer Polytechnic Institute, Sep. 30-Oct. 1, 1992</i>	
	IBM Technical Disclosure Bulletin, "Mouse Ball-Actuating Device With Force and Tactile Feedback," Vol. 32, No. 9B, February 1990	
	Terry et al., "Tactile Feedback In A Computer Mouse," <i>Proceedings of Fourteenth Annual Northeast Bioengineering Conference, University of New Hampshire, March 10-11, 1988</i>	
	Howe, "A Force-Reflecting Teleoperated Hand System for the Study of Tactile Sensing in Precision Manipulation," <i>Proceedings of the 1992 IEEE International Conference on Robotics and Automation, Nice, France, May 1992</i>	
	Eberhardt et al., "OMAR - A Haptic display for speech perception by deaf and deaf-blind individuals," <i>IEEE Virtual Reality Annual International Symposium, Seattle, WA, Sep. 18-22, 1993</i>	
	Rabinowitz et al., "Multidimensional tactile displays: Identification of vibratory intensity, frequency, and contractor area," <i>Journal of The Acoustical Society of America, Vol. 82, No. 4, October 1987</i>	
	Bejczy et al., "Kinesthetic Coupling Between Operator and Remote Manipulator," <i>International Computer Technology Conference, The American Society of Mechanical Engineers, San Francisco, CA, August 12-15, 1980</i>	
	Bejczy et al., "A Laboratory Breadboard System For Dual-Arm Teleoperation," <i>SOAR '89 Workshop, JSC, Houston, TX, July 25-27, 1989</i>	
	Ouhyoung et al., "A Low-Cost Force Feedback Joystick and Its Use in PC Video Games," <i>IEEE Transactions on Consumer Electronics, Vol. 41, No. 3, August 1995</i>	
	Marcus, "Touch Feedback in Surgery," <i>Proceedings of Virtual Reality and Medicine The Cutting Edge, Sep. 8-11, 1994</i>	
	Bejczy, et al., "Universal Computer Control System (UCCS) For Space Telerobots," <i>CH2413-3/87/0000/0318501.00 1987 IEEE, 1987</i>	
	SCANNELL, "Taking a Joystick Ride," <i>Computer Currents, Boston Edition, Vol. 9, No. 11, November 1994.</i>	
	"Component Maintenance Manual With Illustrated Parts List, Coaxial Control Shaker Part No. C-25502," <i>Safe Flight Instrument Corporation, Revised 28 January 2002 (3 pages).</i>	
	"Technical Manual Overhaul Instructions With Parts Breakdown, Coaxial Control Shaker Part No. C-25502," <i>Safe Flight Instrument Corporation, Revised 15 July 1980 (23 pages).</i>	
	Adelstein, "A Virtual Environment System For The Study of Human Arm Tremor," <i>Ph.D. Dissertation, Dept. of Mechanical Engineering, MIT, June 1989, archived 3/13/90</i>	
	Bejczy, "Sensors, Controls, and Man-Machine Interface for Advanced Teleoperation," <i>Science, Vol. 208, No. 4450, pp. 1327-1335, 1980</i>	
	Bejczy et al., "Generalization of Bilateral Force-Reflecting Control of Manipulators," <i>Proceedings Of Fourth CISIM-IFToMM, Sep. 8-12, 1981</i>	
	McAfee et al., "Teleoperator Subsystem/Telerobot Demonstrator: Force Reflecting Hand Controller Equipment Manual," <i>JPL 1988, JPL D-5172</i>	
	Minsky, "Computational Haptics: The Sandpaper System for Synthesizing Texture for a Force-Feedback Display," <i>Ph.D. Dissertation, MIT, June 1995, archived 7/6/95</i>	
	Jacobsen et al., "High Performance, Dextrous Telerobotic Manipulator With Force Reflection," <i>Intervention/ROV '91 Conference & Exposition, Hollywood, Florida, May 21-23, 1991</i>	
	Shimoga, "Finger Force and Touch Feedback Issues in Dexterous Telemanipulation," <i>Proceedings of Fourth Annual Conference on Intelligent Robotic Systems for Space Exploration, Rensselaer Polytechnic Institute, Sep. 30-Oct. 1, 1992</i>	
	IBM Technical Disclosure Bulletin, "Mouse Ball-Actuating Device With Force and Tactile Feedback," Vol. 32, No. 9B, February 1990	
	Terry et al., "Tactile Feedback In A Computer Mouse," <i>Proceedings of Fourteenth Annual Northeast Bioengineering Conference, University of New Hampshire, March 10-11, 1988</i>	
	Howe, "A Force-Reflecting Teleoperated Hand System for the Study of Tactile Sensing in Precision Manipulation," <i>Proceedings of the 1992 IEEE International Conference on Robotics and Automation, Nice, France, May 1992</i>	
	Eberhardt et al., "OMAR - A Haptic display for speech perception by deaf and deaf-blind individuals," <i>IEEE Virtual Reality Annual International Symposium, Seattle, WA, Sep. 18-22, 1993</i>	
	Rabinowitz et al., "Multidimensional tactile displays: Identification of vibratory intensity, frequency, and contractor area," <i>Journal of The Acoustical Society of America, Vol. 82, No. 4, October 1987</i>	
	Bejczy et al., "Kinesthetic Coupling Between Operator and Remote Manipulator," <i>International Computer Technology</i>	

Examiner Signature	/Regina Liang/	Date Considered	12/06/2006
--------------------	----------------	-----------------	------------

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

Substitute for form 1449A/PTO				<i>Complete if Known</i>	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT <i>(use as many sheets as necessary)</i>					
Sheet	9	of	9	Application Number	
				Filing Date	Herewith
				First Named Inventor	Erik SHAHOIAN
				Group Art Unit	
				Examiner Name	
				Attorney Docket Number	IMMR-046/02US

RL	<i>Conference, The American Society of Mechanical Engineers, San Francisco, CA, August 12-15, 1980</i>	
	Bejczy et al., "A Laboratory Breadboard System For Dual-Arm Teleoperation," <i>SOAR '89 Workshop, JSC, Houston, TX, July 25-27, 1989</i>	
	Ouhyoung et al., "A Low-Cost Force Feedback Joystick and Its Use in PC Video Games," <i>IEEE Transactions on Consumer Electronics, Vol. 41, No. 3, August 1995</i>	
	Marcus, "Touch Feedback in Surgery," <i>Proceedings of Virtual Reality and Medicine The Cutting Edge, Sep. 8-11, 1994</i>	
	Bejczy, et al., "Universal Computer Control System (UCCS) For Space Telerobots," <i>CH2413-3/87/0000/0318501.00 1987 IEEE, 1987</i>	
	SCANNELL, "Taking a Joystick Ride," <i>Computer Currents, Boston Edition, Vol. 9, No. 11, November 1994.</i>	
	"Component Maintenance Manual With Illustrated Parts List, Coaxial Control Shaker Part No. C-25502," <i>Safe Flight Instrument Corporation, Revised 28 January 2002 (3 pages).</i>	
▼	"Technical Manual Overhaul Instructions With Parts Breakdown, Coaxial Control Shaker Part No. C-25502," <i>Safe Flight Instrument Corporation, Revised 15 July 1980 (23 pages).</i>	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

195837 v1/RE
473X011.DOC

¹ Unique citation designation number.

² Applicant is to place a check mark here if English language Translation attached.

Examiner Signature	/Regina Liang/	Date Considered	12/06/2006
--------------------	----------------	-----------------	------------

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.